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EXAMINER	
WANG, QUAN ZHEN	
ART UNIT	**PAPER NUMBER**
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary	Application No.	Applicant(s)	
	09/991,126	NISSOV ET AL.	
	Examiner	Art Unit	
	Quan-Zhen Wang	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,9,10,12,15,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,9,10,12,15,26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Claim 15 is objected to because of the following informalities: Claim 15 depends on claim 6 which is cancelled. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 depends a cancelled claim 6.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-5, 9, 10, 12, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. (U.S. Patent US 6,785,042 B1) in view of Kinoshita (U.S. Patent US 6,108,123).

Regarding claims 1, 26, Onaka discloses an optical communications system (figs. 47, 52, and 53) comprising: transmitter (fig. 47, optical sender OS 5) for transmitting an optical signal; receiver (fig. 47, optical receiver OS 6) for detecting the optical signal; and an optical fiber communications interposed between the transmitter and the receiver (fig. 47, the optical fiber links OS5 and OR 6), the optical fiber communications link comprising: a plurality of optical fiber spans of varying span lengths (fig. 47, transmission path 7; column 16, lines 3-6) and inherently having variable span loss coupled between said transmitter and saind receiver (fig. 47, OS 5 and OR 6, respectively); a plurality Raman assisted EDFA hybrid amplifiers (fig. 47, the first EDFA and Raman amplifier system on the left hand side of first optical coupler 3A; and the second EDFA and Raman amplifier system between the first optical coupler 3A and second optical coupler 3A near OR 6; and figs. 52 and 53), each having Raman amplifier variable gain portion (fig. 47, the Raman amplification 7 directly connected to OS 5 and the Raman amplification 7 directly connected to first optical coupler 3A) and an EDFA gain portion (fig. 47, the EDFA 8 directly connected to the first optical coupler 3A, and the EDFA 8 directly connected to the second optical coupler 3A); wherein each of the Raman amplifier is configure to provide a different gain based one the span loss. The system of Onaka differs from the claimed invention in that Onaka does not specifically teach an optical attenuator coupled to the output of the EDFA gain portion. However, it is well known in the art to use an optical attenuator coupled to the output of an EDFA gain portion. For example, Onaka in another embodiment (fig. 31) discloses the use of an optical attenuator (fig. 31, attenuator 85) to couple the output of an EDFA

gain portion. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate an optical attenuator, such as the one disclosed in fig. 31, in the system of figs. 47, 52, and 53 to couple output of an EDFA gain portion in order to adjust the output power from the amplifier system. The modified system of Onaka differs from the claimed invention in that Onaka does not specifically disclose that the EDFA gain portion of the plurality hybrid amplifier has substantially the same total input power as each of the other EDFA throughout the optical communications link. However, it is well known in the art to configure a system such that the total input power of each EDFA is the same throughout the communications link. For example, Kinoshita discloses that the total input power supplied to each EDFA is the same in the system (fig. 8, EDFA 96; column 9, lines 28-38). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to configure the Raman amplifiers in the system of Onaka to supply the same total input power to each EDFA regard less of the varying span, as it is taught by Kinoshita, in order to simplify the circuitry of automatic-level-control of the EDFA gain portion.

Regarding claim 2, Onaka further teaches at least one dispersion-compensation fiber disposed between at least one of the Raman amplifier variable gain portions and at least one of the EDFA gain portions (fig. 53, DCF 84).

Regarding claim 3, the system of Onaka differs from the claimed invention in that Onaka does not specifically teach that at least one dispersion-compensation fiber disposed within the Raman amplifier variable gain portion. However, it is well known in

the art to include dispersion-compensation fiber disposed within the Raman amplifier variable gain portion. For example, Onaka in another embodiment (fig. 29) discloses to include dispersion-compensation fiber (fig. 29, DCF9) disposed within the Raman amplifier variable gain portion. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include dispersion-compensation fiber disposed within the Raman amplifier variable gain portion in order to compensate the attenuation of the optical signal in the dispersion compensation fiber.

Regarding claim 4, Onaka further discloses that the EDFA gain portion comprises a multi-stage EDFA (fig. 52).

Regarding claim 5, Onaka further discloses that a least one dispersion-compensation fiber disposed between stages of the multi-stage EDFA (fig. 52, DCF84).

Regarding claim 9, Onaka further discloses that the optical attenuator of each the plurality of Raman assisted EDFA hybrid amplifiers is configured to reduce the output power of the EDFA gain portion (fig. 31, column 20, lines 54-65).

Regarding claims 10, and 27, Onaka differs from the claimed invention in that Onaka does not specifically teach that the optical attenuators are configured for reducing the output power of the EDFA gain portions in1 dB increments. However, Onaka further teaches that the attenuator is used to control the output power. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to configure the attenuators to reduce the power in 1 dB or other appropriate increments to optimize the power launched into next adjacent

Raman assisted EDFA hybrid amplifier in order to optimize the performance of the system.

Regarding claim 12, Onaka differs from the claimed invention in that Onaka does not specifically teach that the optical attenuator of each plurality of Raman assisted EDFA hybrid amplifiers is configured to reduce the output power of the EDFA gain portion to provide an optimum power to be launched into the next adjacent Raman assisted EDFA hybrid amplifier. Raman amplifier variable gain portions are manually adjusted until the EDFA gain portions have substantially the same input power throughout the optical fiber communications link. However, Onaka further teaches to adjust the Raman amplifier variable gain portions (column 3, lines 22-67, and column 4, lines 1-65; column 4, lines 44-53). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to configure the optical attenuator of each plurality of Raman assisted EDFA hybrid amplifiers to reduce the output power of the EDFA gain portion to provide an optimum power to be launched into the next adjacent Raman assisted EDFA hybrid amplifier.

Response to Arguments

6. Applicant's arguments file on December 18, 2006 have been fully considered but they are not persuasive.

Applicant argues that Onaka is devoid of teachings of "a plurality of optical fiber spans of varying span lengths and span loss". Examiner respectfully disagrees with Applicant. Any one skilled in the art would understand that the spans that connection a

transmitting node and a receiving node could vary because of the natural conditions of the area where the system is deployed, the convenience of the location of the repeaters, etc.. As a matter of fact, none of the existing optical communication systems, especially terrestrial systems, has **exact equal spans** between the transmitting and receiving nodes. Onaka also specifically discloses, "As the optical transmission path 7, there are used such as 1.3 μm zero-dispersion SMF and dispersion-shifted fiber (DSF, NZ-DSF) having a length for one repeater section **such as in the order of 40 to 100 km**." (Column 16, lines 3-6. emphasis added). Because the span length in an optical communication system is inevitably varying, the span loss is also inevitably varying. Therefore, the rejections of the claims still stand.

7. Applicant's arguments file on December 18, 2006 have been considered but they are moot in view of the new ground of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Taylor et al. (U.S. Patent US 6,178,038 B1) discloses a optical amplifier with Raman pumped dispersion compensation fiber to improve noise figure; Friedrich (U.S. Patent US 6,466,362 B1) discloses hybrid optical amplifiers including EDFA and a Raman amplifier to reduce the noise generated from the amplifier; Islam (U.S. Patent Application Publication US 2003/0058523 A1) discloses multi-stage optical amplifier including EDFA and Raman amplifiers.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qzw
1/19/2007

HANH PHAN
PRIMARY EXAMINER